

LA-UR-20-21289

Approved for public release; distribution is unlimited.

Title: 6U SpaceVPX / OpenVPX Payload Processor

Author(s): Merl, Robert Bernard

Intended for: Share with industry

Issued: 2020-02-10

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Triad National Security, LLC for the National Nuclear Security Administration of U.S. Department of Energy under contract 89233218CNA000001. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

6U SpaceVPX / OpenVPX Payload Processor



Rob Merl

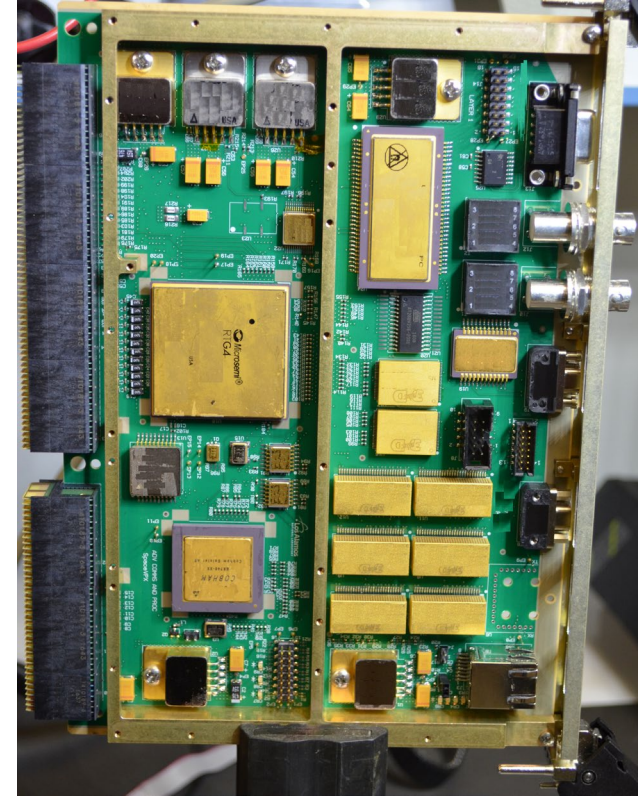
February 2020



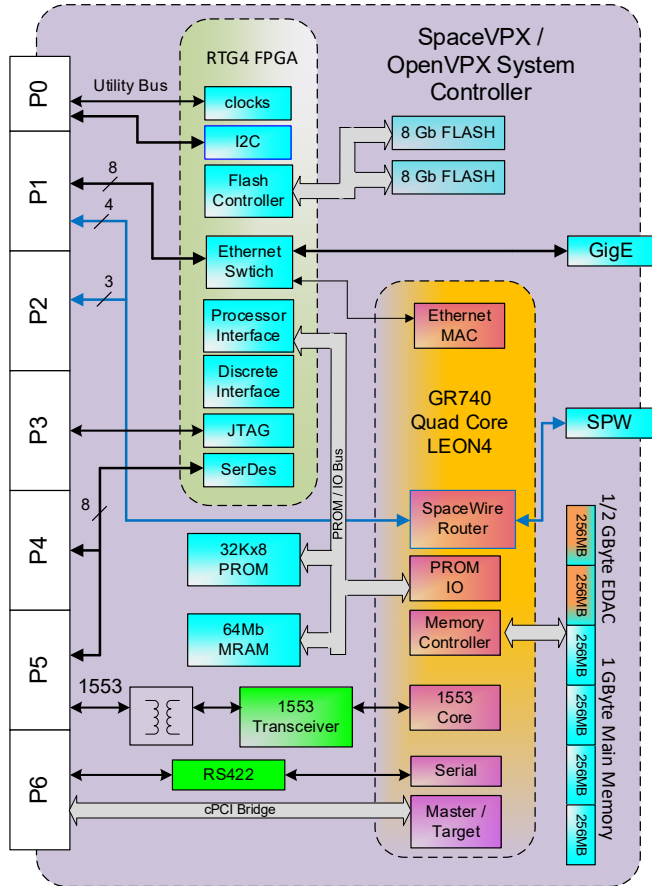
Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

Space Grade Single Board Computer

- 6U Eurocard VPX
 - 230 mm x 160 mm
 - Interoperable between OpenVPX and SpaceVPX
 - Complies with ANSI/VITA 65 and 78
 - SLT6-SWH-16U20F-10.4.2 and SLT6-SWC-12F16T-10.4.1 System Controller and Switch slot profiles
- For use in GEO / MEO / LEO Orbits
 - 100 Krad TID
 - latch up immune 103 MeV/mg/cm²
 - Mechanically Hardened
 - Meets or exceeds NASA GEVS for shock, vibration, thermal
 - Conduction Cooled Frame
 - Hypertac Connectors
 - QMLV or Class S components
- Low Power / 8.5 W



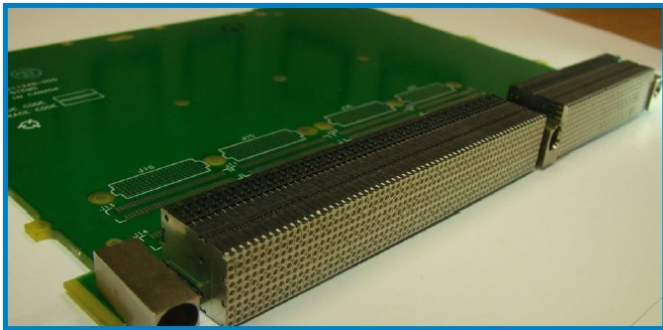
Flexible and Reconfigurable



- Quad Core LEON4 / GR740 Processor
 - GFLOP performance
 - 1 Gbyte SDRAM / 0.5 Gbyte EDAC
 - 2 Gbytes Non-Volatile Storage
 - PROM / MRAM / SDRAM memory hierarchy
- VxWorks RT Operating System
- Reconfigurable RTG4 FPGA
- Common Space Grade Interfaces
 - SpaceWire
 - I2C
 - discrete IO
 - MIL-STD-1553B
 - high speed serial

Commercial Interoperability

- Interoperates with commercial backplanes, enclosures, modules, and test equipment
- Can be inserted into flight like system late in design cycle
- Designed for assembly with low cost commercial VPX connectors or flight grade Hypertac in the same footprints



Los Alamos designed SpaceVPX System Controller in commercial system